

CLAIMS

WHAT IS CLAIMED IS:

1. A method for reconstructing transient acoustic radiation from an object including the steps of:

a) measuring transient acoustic pressure at a plurality of measurement points around the object subject to an arbitrarily time-dependent excitation; and

b) reconstructing the transient acoustic pressure at points other than the measurement points based upon the measurements at the plurality of measurement points.

2. The method of claim 1 wherein the object is an arbitrarily shaped object.

3. The method of claim 1 wherein said step b) further includes the step of expanding the acoustic pressure in terms of the spherical Hankel functions.

4. The method of claim 1 wherein the transient acoustic pressure everywhere is determined in said step b).

5. The method of claim 1 wherein the transient acoustic pressure on a surface of the object is determined in said step b).

6. The method of claim 1 further including the step of using a Laplace transform having an s-domain.

7. The method of claim 6 further including the step of expressing the acoustic pressure in the s-domain as an expansion.
8. The method of claim 7 further including the step of expressing the acoustic pressure in the s-domain as an expansion in terms of spherical Hankel functions.

9. A system for reconstructing an acoustic field comprising:
a plurality of transducers each measuring acoustic pressure at a measurement point around a noise source generating transient acoustic radiation; and
a computer reconstructing transient acoustic pressure at points other than the measurement points based upon the acoustic pressure as measured by the transducers.
10. The system of claim 9 wherein the source is an arbitrarily shaped object.
11. The system of claim 9 wherein the computer expands the acoustic pressure in terms of spherical Hankel functions.
12. The system of claim 9 wherein the computer determines the transient acoustic pressure everywhere.
13. The system of claim 9 wherein the computer determines the transient acoustic pressure on a surface of the source.
14. The system of claim 9 wherein the computer uses a Laplace transform having an s-domain to reconstruct the transient acoustic pressure.
15. The system of claim 14 wherein the computer expresses the acoustic pressure in the s-domain as an expansion.

16. The system of claim 15 wherein the computer expresses the acoustic pressure in the s-domain as an expansion in terms of spherical Hankel functions.

17. A computer-readable storage medium having a computer program stored thereon, which when executed by a computer performs the steps of:

a) receiving signals indicating sound at a plurality of measurement points around a noise source generating transient acoustic radiation; and

b) reconstructing a transient acoustic field at points other than the measurement points based upon the signals.

18. A system for reconstructing an acoustic field comprising:
- a plurality of transducers each measuring acoustic pressure at a measurement point around a noise source generating transient acoustic radiation; and
 - means for reconstructing transient acoustic pressure at points other than the measurement points based upon the acoustic pressure as measured by the transducers.